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ABSTRACT

A report on implementation of the Multicultural Reading and Thinking (McRAT) Program in Arkansas from 1989-92 chronicles the program's development, operation, and results. McRAT is a staff development program designed to help teachers infuse higher order thinking processes and multicultural concepts into regular classroom curricula (grades 3 to 8). The program provides teachers with explicit strategies for teaching reasoning and problem solving throughout the curriculum; it trains teachers in state-of-the art alternative assessment approaches to evaluating student progress, emphasizes intercultural concepts as a meaningful context for application of thinking and problem- solving strategies, and includes methods for integrating direct instruction with other effective strategies such as cooperative learning, process writing, and facilitated group discussion. Data on the program were from evaluation of student essays using scoring consistent with those of other large-scale writing assessments. Findings included the following: (1) McRAT students demonstrated evidence of higher order thinking through significantly higher gains on analytically scored essays than non-McRAT students; (2) participants demonstrated retention of learning over time; (3) McRAT students outperformed control students regardless of classification; (4) no statistically significant difference between performance of minority versus non-minority students; and (5) assessment procedures showed a high degree of inter-rater reliability. Ten tables provide detailed program evaluation results. (Contains 11 references.) (JB)

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McRAT Report

Multicultural Reading and Thinking

Number 2 ARKANSAS DEPARTMENT OF EDUCATION Spring 1994

A Three-Year Report — 1989-92

Janita J. Hoskyn

Introduction

This report provides information about the development, operation, and results of the Multicultural Reading and Thinking (McRAT) Program in Arkansas for the period 1989-92. Part I gives explanatory and background information on the McRAT Program. Part II reports research results on program effectiveness and continuity over a three-year period.

Part I — The McRAT Program

Multicultural Reading and Thinking (McRAT) is a staff development program designed to help teachers infuse higher-order thinking processes and multicultural concepts into regular classroom curricula. It has been developed, refined, and rigorously evaluated since its beginning in 1986 as a collaborative effort of Arkansas Department of Education reading specialists and classroom teachers.

It has been validated, grades 3-8, by the National Diffusion Network (NDN), U.S. Department of Education, and was named one of the most effective educational interventions in Arkansas by the 1992 Educational Policy Study by the Winthrop Rockefeller Foundation.

McRAT integrates thinking and problem-solving processes into the core of educational practice, namely the interactions between teacher and student in regular classrooms. First, the program provides teachers with explicit strategies for teaching reasoning and problem solving throughout the curriculum.

Second, it trains teachers in a state-of-the-art, alternative assessment approach to evaluating students' progress. Third, while the program emphasizes the teaching of intercultural concepts as a meaningful context for the application of thinking and problem-solving strategies, teachers are taught how to use the framework of higher-order thinking throughout the curriculum.

Finally, McRAT includes methods for integrating direct instruction with other effective strategies such as cooperative learning, process writing, and facilitated group discussion.

Consistent with provisions of Act 236, the program embodies the movement toward linkage between instructional programs and "alternative assessment."

Further, it empowers teachers to deliver effective instruction to the wide range of abilities found in regular classrooms — including special education students, Chapter 1 and gifted students, as well as the "average" students.

Rationale:

McRAT embodies much of what has been learned from contemporary research about effective contexts for learning, staff development, literacy, and assessment. Wells (1990), Graves (1983), and Anderson (1983), among others, have emphasized that reading comprehension is enhanced by reading a wide range of content, by reading strategy instruction, and by the explicit linkage of reading and writing. National reports on student achievement in reading and writing have indicated the need for instruction that teaches students to reason more effectively about what they have read, to defend or elaborate on their ideas, and to communicate them in writing (Applebee, 1988; Langer, 1990).

McRAT utilizes the framework of thinking skills outlined by Quellmalz (1985). Four broad categories of thinking skills are included: analysis, comparison, inference/interpretation, and evaluation. This particular framework was selected because it addresses a common body of knowledge in philosophy and psychology (e.g., Bloom, 1971); it is conceptually clear; and it easily generates classroom assessment data (Stiggins, 1989).

McRAT incorporates findings from research on effective staff development (e.g., Guskey, 1986). This body of work shows that, to change classroom practices, teachers need extensive training that includes modeling of desired practices. Moreover, teachers need continuous support from administration, competent and easily accessed technical assistance, and clear evidence that their changes are benefiting students.

Teacher Inservice Program:

McRAT's training of teachers in Arkansas extends over two years. As teachers receive training, they simultaneously implement the program with students. Year 1 includes a total of nine days of training beginning with an initial three-day session in August, followed by three additional days and a series of half-day sessions scheduled throughout the year. Administrators are strongly encouraged to participate in the initial 3-5 days of training. The focus of the training is on explicit teaching and infusion of strategies for each of the four thinking processes; lesson design and construction; and procedures for evaluation of student writing. Half-day sessions provide time for collaboration, curriculum evaluation, and lesson development.

Year II training focuses on more advanced techniques for curriculum development, classroom assessment and collaboration. It includes peer coaching, where teachers observe each other teaching McRAT strategies and provide appropriate feedback.

McRAT Leader Program:

A six-day leadership training program has been implemented to assist school districts with dissemination of the program within their districts. Applicants must have successful McRAT teaching experience, be recommended by the school principal and regional McRAT trainer, and demonstrate leadership qualities. A total of seven have been trained and are providing leadership in their respective districts.

School Participation:

The program is provided to schools upon written request to the Department of Education reading office. Participation is limited to approximately 150 new teachers each year due to funding and the number of trainers available, Training is provided by reading specialists at each of the fifteen educational cooperatives. Schools provide all instructional materials and equipment but receive grants to assist with the cost of teacher-release time.

McRAT Instruction:

Instruction focuses on four fundamental kinds of reasoning — analysis, comparison, inference/interpretation, and evaluation — that students can use in all academic subjects and that also transfer to practical situations. Students learn explicit strategies for each kind of reasoning and an awareness of how the strategies can

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transfer across problems. For example, they might analyze data in math and science, the social institutions of a culture in social studies, the different kinds of literature in English or reading, or the cultural diversity of the neighborhood where they live. McRAT lessons directly address student learning expectations from the state curriculum frameworks.

McRAT uses literature commonly available in school libraries and classrooms. The program recommends fiction and nonfiction that will expose students to other historical periods and perspectives as well as different parts of the world. In the increasing diversity of our nation, as well as the emergence of the "global village," the program helps students learn about others through their own eyes. For example, after reading several selections about homelessness, they may write an essay "inferring what life would be like if you were homeless." They may analyze ways in which the actions of a story character reflect the customs, values, and beliefs of the culture. They may compare the art, music, and literature of various cultures or the contributions of historical figures. Lessons or units of study often involve parents and community.

Part II — Research Report 1989-92

The following is a description of data on the McRAT Program for the three-year period between 1989 and 1992. Table 1 shows growth of the program during this period.

Major research findings are described with supporting data on program effectiveness and continuity during this period. Table 2 shows demographics of students in evaluation samples. Data were derived through evaluation of student essays that employ the four types of reasoning that are the focus of the staff development process. Analyses of students' essays show increased ability to reason and to communicate ideas through writing. Essays were scored using procedures consistent with those of other large-scale writing assessments.

TABLE 1 Teachers in McRAT Training 1989-92

Year	No. Teachers	No. Students Involved
1989-90	90	2250
1990-91	126	3150
1991-92	125	3125
Total	341	8525

TABLE 2 Demographics of Students in Evaluation Samples

Students	Total No	Chapt 1	Gifted /Talented	Minority
1989-90 McRAT	234	25%	15%	32%
Comparison	108	10%	15%	30%
1990-91 McRAT	106	8%	17%	22%
1991-92 McRAT	346	12%	20%	21%

Finding 1

McRAT Students demonstrated evidence of higher-order thinking as shown by significantly higher gains on analytically scored essays than non-McRAT students. Results are consistent regardless of students' gender, race, or prior achievement level.

1989-90 (Year 1):

A study was conducted involving 342 randomly selected fourth, fifth-, and sixth-grade students in six schools participating in the McRAT Program. The schools selected were representative of the state population in different regions of the state, and each was able to provide classrooms for both McRAT and control groups within the school.

Table 3 displays the means for McRAT and comparison groups. As can be seen from these statistics, the McRAT group initially scored lower than the comparison group on all four essays.

The post-test means demonstrate a clear difference between McRAT and comparison students. McRAT classes significantly exceed comparison classes on all four thinking skills. Perhaps the most dramatic is Evaluation, where initially comparison students exceeded McRAT students overall by almost ten points. On the post-test, comparison students had remained virtually the same, while McRAT students had gained over 20 points on thethinking skill that is taught last in the McRAT sequence because it encompasses elements of the three others.

A considerable proportion (about 30%) of students' pre-test essays were "off-task" and were given a total score of 0 (zero). "Off-task" essays included responses that were listings of words or sentences, written about topics unrelated to the task, or otherwise unconnected discourse. These essays were considered unscoreable.

Table 4 shows that many more McRAT students were included in this group. However on the post-test essay, far more comparison students were "off-task" than McRAT students. Further examination of the "off-task" group revealed that students with one or more "off-task" essays were more likely to be Chapter 1 students.

The clear implication of this analysis is that educationally disadvantaged students are less likely to write connected text without explicit instruction such as that provided in McRAT classrooms. These patterns are consistent throughout the three years of this study.

Table 4 also displays the post-test means of McRAT and comparison students who were off-task on the pre-test. As can be seen by comparing these means to those in Table 3, these students were comparable to their peers after McRAT instruction. The increased number of off-task responses observed in the fourth-grade control group post-assessments occurred in one classroom, possibly indicating an environmental factor.

TABLE 3 Mean Ratings of McRAT and Comparison Students 1989-90

	McRAT				Comparison			
Thinking Skill	N	Pre	Post	Gain	N	Pre	Post	Gain
Analysis	157	35.7	59.3	23.6	99	44.9	50.8	+5.9
Comparison	119	24.4	51.5	26.9	83	26.8	35.5	+8.7
Inference	76	24.6	45.5	20.4	65	31.9	32.1	+0.2
Evaluation	114	35.8	55.3	19.5	99	45.5	44.0	-1.5

Note: These are means for students with scoreable essays for both pre- and post-administrations. Results for students who were off-task on the pre-test (0 total score) were computed separately. The variations in number of students (N) reflect this separation.

TABLE 4 Comparison of Number of Off-Task Responses and Post-Test Mean Scores

	McRAT			Comparison		
Thinking Skill	No. Off Task		Post-Test Mean	No. Off-Task		Post-Test Mean
	Pre	Post		Pre	Post	
Analysis	73	1	54.4	6	27	39.0
Comparison	52	1	43.2	13	19	26.0
Inference	68	10	39.7	37	37	32.5
Evaluation	49	7	49.6	5	10	20.0

Finding 2

McRAT students demonstrated retention of learning.

This study included a longitudinal follow-up of students from the 1989-90 study and a random sample of students who entered the program during the next two years. The purpose was to ascertain whether the effects of McRAT were stable over time and replicable.

1990-91 (Year 2):

Table 5 shows a comparison of the mean scores of students with and without previous McRAT instruction. Scores reveal that although the students not having previous McRAT instruction showed more improvement, the overall post-test scores for the two groups were very similar. The generally higher pre-test scores for the students with previous McRAT instruction indicate that much of the previous year's learning carried over into the second year for these students.

1991-92 (Year 3):

The results were very similar. Overall, the students showed average gain scores between 9.4 and 29.3. In general, the post-test scores for the students with one year of previous McRAT instruction were higher than those for students without previous McRAT instruction. Also, the post-test scores for students with two years of previous instruction were generally higher than for students with one year of previous instruction.

Together, these two patterns seem to indicate that students with more McRAT instruction tend to perform better and they tend to retain more of what they have learned.

Finding 3

McRAT students, regardless of classification, outperformed control students. Substantial gains were exhibited by McRAT students regardless of the number of years of previous instruction.

Tables 7 and 8 present comparisons of mean scores of students who were classified as Chapter 1, Gifted, Special Ed, or Regular. As expected, Chapter 1 and Special Ed students generally had mean scores which were slightly lower than the regular students, whose scores were in turn slightly lower than those students identified as gifted. Nevertheless, the same patterns of relationships appear to be present. McRAT students, regardless of classification, generally outperformed the control group students.

Data in Table 8 shows the comparison of mean scores for Chapter I, Regular, Gifted, and Special Education students with 0, 1, or 2 years of previous McRAT instruction. The significant increase in pre-test scores each year for students in each group indicates that students, regardless of achievement level, are learning and retaining their learning from year to year.

The McRAT curriculum seems to be effective for all students, as substantial gains were exhibited by all four classifications, regardless of the number of years of previous instruction they may have had.

Finding 4

There were no statistically significant differences between performance of minority vs. non-minority students in the McRAT Program.

In general, both minority and non-minority students benefited from receiving McRAT instruction. Three studies in Table 9 clearly show that all students, minority and non-minority, performed better after McRAT instruction than they did before. In general, the non-minority students showed slightly greater gains than did the minority students, although in all but two of these cases, the average gains in both groups were substantial. Two cases in 1990-91 in which the minority students' gains were markedly smaller than the non-minority students warrant further examination.

TABLE 5 Comparison of Mean Scores for Students with and without Previous McRAT Instruction 1990-91

	With			Without		
	Pre	Post	Gain	Pre	Post	Gain
Analysis	52.1	63.3	11.2	39.3	60.7	21.4
Comparison	41.7	56.1	14.4	30.6	58.5	27.9
Inference	42.4	59.6	17.2	28.5	53.3	24.8
Evaluation	47.7	73.0	25.3	39.6	68.9	29.3

TABLE 6 Comparison of Mean Scores for Students with 0, 1, or 2 Years of Previous McRAT Instruction

	0 Yrs.			1 Yr.			2 Yrs.		
	Pre	Post	Gain	Pre	Post	Gain	Pre	Post	Gain
Analysis	44.2	60.3	16.1	53.5	64.5	11.0	60.5	69.6	9.4
Comparison	27.9	51.7	23.8	40.4	54.8	14.4	42.7	59.9	17.2
Inference	33.6	56.5	22.9	39.0	60.0	21.0	48.1	77.4	29.3
Evaluation	44.3	71.3	27.0	50.2	74.8	24.6	61.3	83.2	21.9

TABLE 7 Comparison of Mean Scores by Classification for McRAT and Control Group Students 1989-90

Chapter 1	McRAT			Control		
	Pre	Post	Gain	Pre	Post	Gain
Analysis	24.4	51.9	27.5	41.4	47.9	6.5
Comparison	19.8	43.8	24.0	20.4	37.1	16.7
Inference	29.3	35.5	6.2	29.7	30.7	1.0
Evaluation	24.1	42.0	17.9	40.4	37.3	-3.1
Regular						
Analysis	35.9	60.9	25.0	44.1	50.7	6.6
Comparison	23.0	51.3	28.3	25.6	33.5	7.9
Inference	23.9	46.7	22.8	31.2	30.9	-0.3
Evaluation	36.8	56.3	19.5	46.5	43.2	-3.3
Gifted						
Analysis	42.4	64.3	21.9	51.0	54.4	3.4
Comparison	34.5	68.5	34.0	35.4	43.8	8.4
Inference	26.6	49.6	23.0	37.1	37.0	-0.1
Evaluation	36.3	65.1	28.8	44.9	51.2	6.3

TABLE 8 Comparison of Mean Scores by Classification for Students with 0, 1, or 2 Years of Previous McRAT Instruction

1991-92		0 Yrs			1 Yr.			2 Yrs.		
		Pre	Post	Gain	Pre	Post	Gain	Pre	Post	Gain
Analysis	Chapter 1	33.1	56.0	22.9	43.7	55.3	11.6	58.8	75.5	16.7
Comparison	Chapter 1	25.3	44.6	19.3	36.8	49.6	12.8	33.0	60.5	27.5
Inference	Chapter 1	31.6	42.2	10.6	35.4	53.2	17.8	45.0	81.0	36.0
Evaluation	Chapter 1	35.1	58.6	23.5	45.1	65.8	20.7	68.5	84.0	15.5
Analysis	Regular	44.1	60.6	16.5	52.1	64.5	12.4	58.2	67.5	9.3
Comparison	Regular	26.8	52.2	25.4	39.8	55.1	15.3	44.7	55.9	11.2
Inference	Regular	33.0	57.7	24.7	34.9	56.6	21.7	45.3	72.1	26.8
Evaluation	Regular	44.4	72.5	28.1	50.0	73.1	23.1	55.4	80.4	25.0
Analysis	Gifted	48.4	65.2	16.8	67.5	74.6	7.1	68.3	69.8	1.5
Comparison	Gifted	32.9	58.8	25.9	48.7	60.4	11.7	48.0	70.3	22.3
Inference	Gifted	35.9	66.3	30.4	51.6	81.1	29.5	57.0	90.0	33.0
Evaluation	Gifted	49.0	81.4	32.4	60.2	90.9	30.7	68.8	91.7	22.9
Analysis	Special Ed	40.8	52.2	11.4	49.3	61.6	14.3			
Comparison	Special Ed	23.0	41.3	18.3	29.2	51.8	22.6			
Inference	Special Ed	28.3	42.4	14.1	37.3	55.5	18.2			
Evaluation	Special Ed	40.6	57.3	16.7	38.2	67.0	28.8			

*No Special Ed students had 2 years of previous McRAT instruction.

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The overwhelming picture from the remainder of the data indicates that both the minority and non-minority students showed important improvement, and this case notwithstanding, the slightly higher gain scores by the non-minority students does not seem to indicate any systematic cultural disparities.

Finding 5

The assessment procedures showed a high degree of inter-rater reliability.

The inter-rater reliability data presented in Table 10 are evidence of the time and effort spent by the McRAT program staff in training and supervising the teachers who were used in the scoring of the essays. In each year the large majority of skills, which were scored on each essay by multiple raters, were in close, if not perfect, agreement. Grading of essays has long been considered as too subjective to do reliably. The percentage of overall agreement and the large correlations indicate that teachers who have been trained in the McRAT curriculum can independently and reliably assess the quality of the students' performance.

Discussion

The Multicultural Reading and Thinking Program (McRAT) is consistent with national goals for education in that students demonstrate the ability to reason, solve problems, apply knowledge, write and communicate effectively. It reflects the major shift in states' efforts in educational reform, focusing on the "core technology" of the school, classroom instruction. It further embodies the movement toward explicit linkages between instructional programs and "alternative assessment." Considerable effort has been given to ensuring the technical quality of the assessment techniques used by McRAT. The program is beneficial to all students, including the educationally disadvantaged, and it promotes students' understanding and appreciation of the diverse cultural heritage of the United States and the world.

Ongoing Research

Additional data from 1989-92 studies are available. Analyses of 1992-93 data are incomplete but seem to show the same trends as the previous years. A 1993-94 study of junior high students with previous McRAT instruction vs. without previous McRAT instruction has been initiated.

Statistical analyses of data have been provided by Dan Mundfrom, Ph.D., assistant professor, Center for Learning and Research, University of Arkansas at Little Rock. Janita Hoskyn is program manager-reading, Division of School and Staff Support Services, Arkansas Department of Education (501/682-4232).

TABLE 9

1989-90 Comparison of Mean Scores for Minority and Non-Minority Students in the McRAT Group

	Minority			Non-Minority		
	Pre	Post	Gain	Pre	Post	Gain
Analysis	33.9	55.9	22.0	36.2	61.0	24.8
Comparison	21.2	44.5	23.3	25.6	55.4	29.8
Inference	20.1	40.0	19.9	25.9	47.4	21.5
Evaluation	31.3	47.5	16.2	37.2	59.2	22.0

1990-91 Comparison of Mean Scores for Minority and Non-Minority Students

	Minority			Non-Minority		
	Pre	Post	Gain	Pre	Post	Gain
Analysis	50.3	57.3	7.0	47.4	63.6	16.2
Comparison	37.2	52.3	15.1	38.4	58.8	20.4
Inference	39.5	45.8	6.3	38.5	59.7	21.2
Evaluation	43.6	63.2	19.6	44.1	72.8	28.7

1991-92 Comparison of Mean Scores for Minority and Non-Minority Students

	Minority			Non-Minority		
	Pre	Post	Gain	Pre	Post	Gain
Analysis	46.7	60.0	13.3	47.7	62.0	14.3
Comparison	31.0	50.4	19.4	31.9	53.4	21.5
Inference	33.8	51.6	17.8	36.7	60.2	23.5
Evaluation	42.7	68.6	25.9	47.7	73.7	26.0

TABLE 10 Inter-Rater Reliability

Difference	Frequency	Percentage
<4	905	.754
4	141	.118
6	90	.075
8	33	.028
10	10	.008
>10	21	.017
Total	1200	1.000

1989-90 Overall Correlation Between Rater 1 and Rater 2: .80

Difference	Frequency	Percentage
0	3465	.711
2	1085	.222
4	178	.037
6	116	.024
8	16	.003
10	6	.001
12	9	.002
14	1	.000
Total	4876	1.000

1990-91 Overall Correlation Between Rater 1 and Rater 2: .95

Difference	Frequency	Percentage
0	2817	.667
2	1049	.248
4	212	.050
6	113	.027
8	23	.005
10	4	.001
12	4	.001
14	3	.001
18	1	.000
Total	4226	1.000

1991-92 Overall Correlation Between Rater 1 and Rater 2: .94

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